

# IEA Bioenergy – ExCo60

## Emission trading and business opportunities

\*connectedthinking

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### Utilities global survey 2007

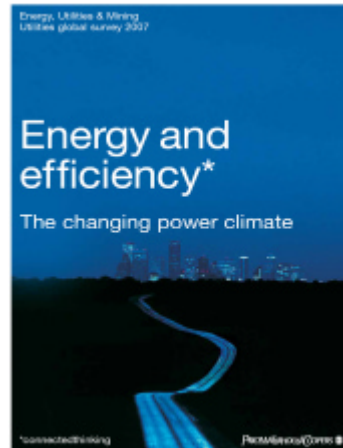
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## Utilities global survey 2007

This years survey interviewed 119 senior power utility executives from 114 utility companies in 44 countries from 4 major regions



## Utilities global survey 2007

- A power utilities sector that appears, ready to make the changes that arise from threat of climate change
- Huge increase in the extent to which renewable and nuclear power are at the top of company agendas
- The report also find an industry that believes that technological advances can take us into a new era of energy efficiency

## The rise of renewables and energy efficiency

Top six ranking of the most major developments in your power market over next five years?

	2007	Last year: 2006	Three years ago: 2004
1	Encouragement of renewable energy	1 Concerns over security of supply	1 Increasing transmission capacity
=2	Increasing efficiency of conventional technologies	2 Encouragement of renewable energy	2 Concerns over security of supply
=2	Concerns about security of supply	3 Increasing regulation and obligation	3 Increased JV activity from oil majors/financial institutions
4	Increasing regulation and obligation	4 Increasing efficiency of conventional technologies	4 Continuing wholesale price volatility
5	Regulation of emissions	5 Continuing wholesale price volatility	5 Increasing regulation and obligation
6	Continuing wholesale price volatility	6 Regulation of emissions	6 Encouragement of renewable energy

Note: Global responses only

Source: PricewaterhouseCoopers, *Utilities global survey 2007*

## The rise of renewables and energy efficiency

Major likely developments in the main regions

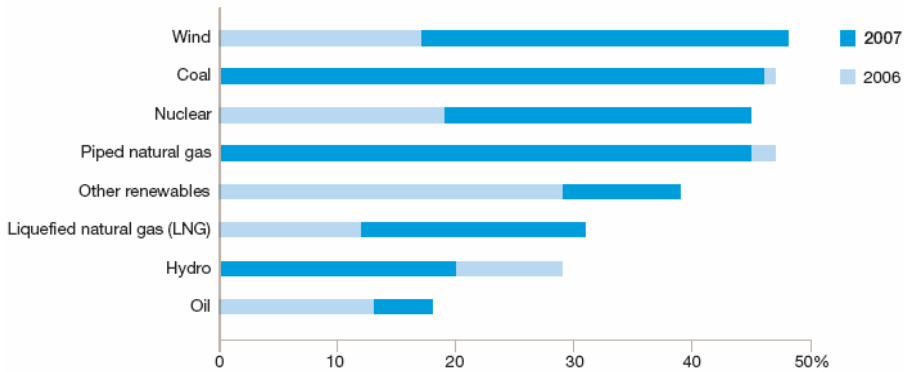
	The Americas	Europe	Asia Pacific
1	Encouragement of renewable energy	1 Encouragement of renewable energy	1 Encouragement of renewable energy
2	Increasing efficiency of conventional technology	2 Security of supply	2 Increasing regulation and obligation
3	Regulation of emissions	=3 Increasing efficiency of conventional technology	3 Increasing JV activity from oil majors/financial institutions
		=3 Regulation of emissions	

Note: Regional responses only

Source: PricewaterhouseCoopers, *Utilities global survey 2007*

## Wind and nuclear power move to the forefront

What type of primary energy supply is expected to account for an increasing portion of your market's energy consumption over the next five years?



**Note:** Global responses only. % share of respondents ranking fuel source in their top 3  
**Source:** PricewaterhouseCoopers, *Utilities global survey 2007*

## Cleaner Coals waits for the long term

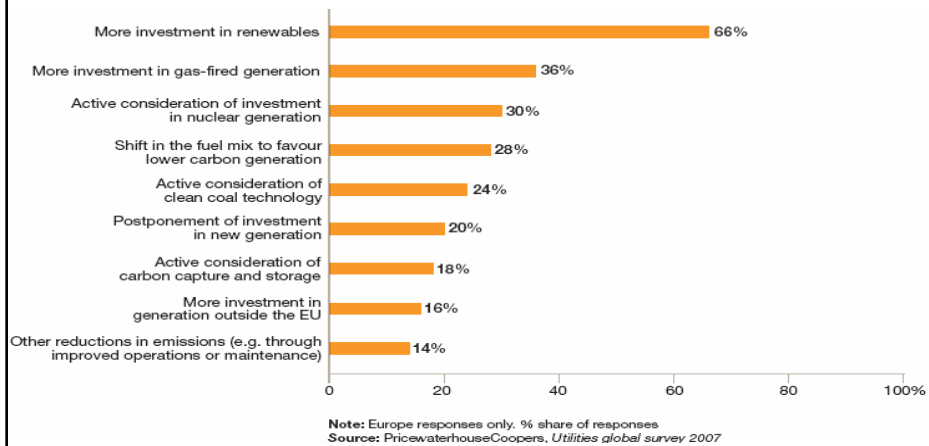
Which technologies do you expect to make the biggest impact on the level of greenhouse gas emission from the supply of electricity?

By 2017		By 2050	
1	Nuclear	1	Nuclear
2	Renewables	2	Renewables
3	Energy efficiency	3	Energy efficiency
4	Gas-fired generation	4	Carbon capture
5	Carbon capture	5	Coal gasification
6	Coal gasification	6	Gas-fired generation

**Note:** Global responses only  
**Source:** PricewaterhouseCoopers, *Utilities global survey 2007*

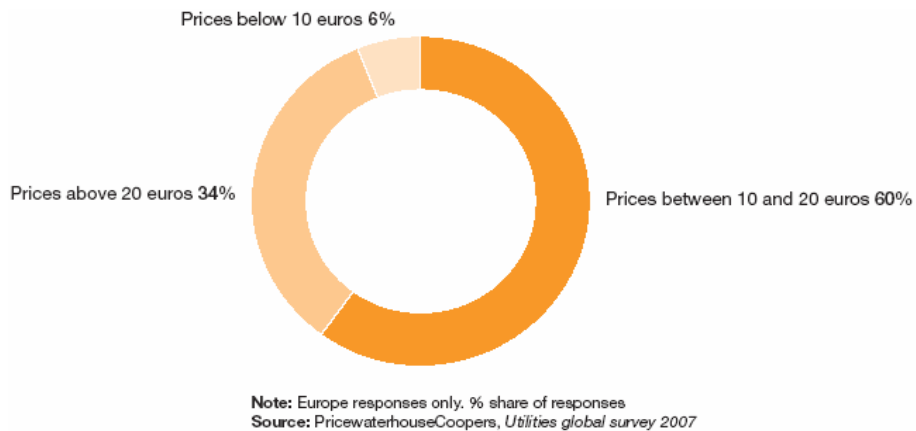
## The impact of emission trading

What impact has the EU ETS had on your business since 1 January 2005?



## Future Carbon prices

What impact do you expect NAP2 to have on carbon prices in the 2008-2012 period?



## Future development of emission trading schemes

Characteristics respondents believe will be important (EU):

- Extended schemes embrace other industries (60%)
- Longer term trading periods to ensure greater certainty (56%)
- More support for auctioning than benchmarking (48%,40%)
- A Global generally accepted approach to monitoring, reporting and compliance from regulators, scheme participants, financial investors and intermediaries

PwC: A new Global Emissions Compliance Language is required  
*Building trust in Emissions Reporting, PwC, 2007*

## Conclusions

It is clear that the climate of thinking and action around cleaner power, renewables and energy efficiency is shifting fast but,

- Economical signals and incentives will be critical
- An efficient carbon price will need to exist across all regions, including countries not covered at present
- Only one third of the respondent expect the price of carbon to rise over 20€ in 2008-2012, estimates says €37,50 is needed to rise renewables to 30-35 % 2030

# Experiences from Bioenergy investments

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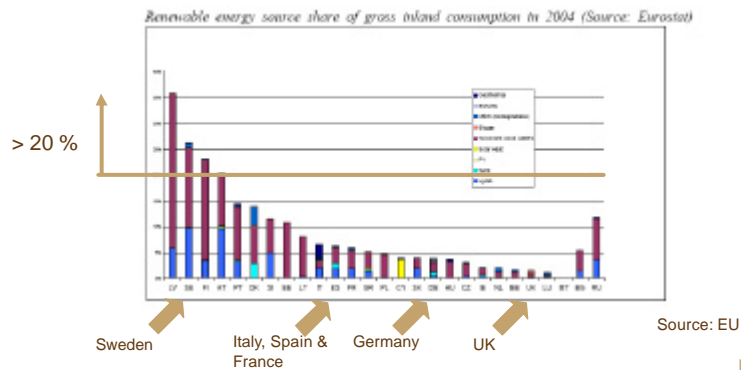
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Increased interest in Renewable Energy

## EU sets ambitious targets on Renewable Energy

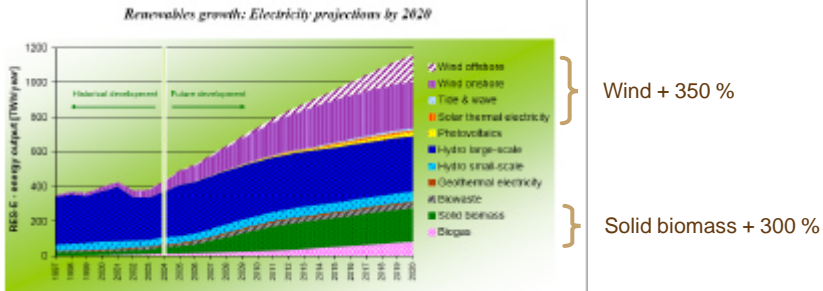
- EU sets targets of 20 % from Renewable Energy to 2020
  - Current level 6,5 %
  - an intended increase of > 200 % in 13 years!
- And EU leads the way in Initial Public Offering - 55 % of world value
- 4 EU countries had 20 % or more Renewable energy use in 2004



Increased interest in Renewable Energy

...and major increase in biomass and wind are projected

- 130 % increase in Renewable used in electricity production
  - Significant increase projected in wind and biomass
  - Increase also in biogas, photovoltaics
- 80 % increase in biomass in heating
- Biofuels the only large scale substitute for petrol and diesel in transport



Source: EU

Increased interest in Bioenergy

...but lacks investments

But US leads the in venture capital – 72 % of world value

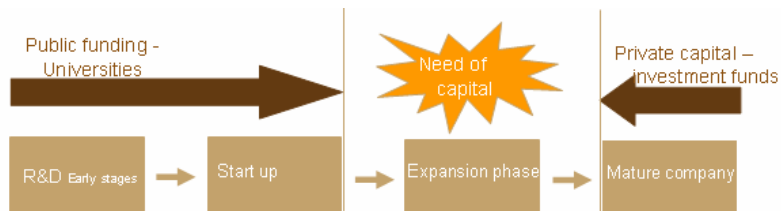
.....and in patents issued – 46 %

Where are the European Cleantech venture capital?

- 40 % of European Cleantech investments from the UK – driven by government support

... .. or where are the European Cleantech companies?

- There is an obvious lack of investors willing to take risks above normal
  - Businesses are looking for angels





## Increased interest in Bioenergy

# Dramatic increase in Cleantech Venture Capital investments

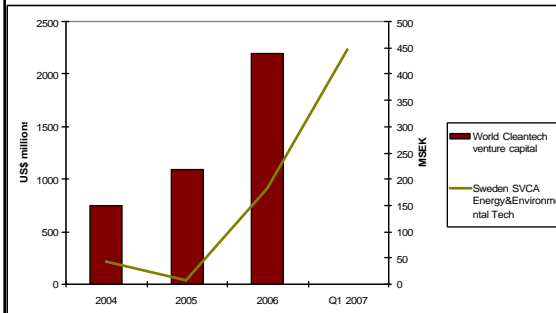
- World Cleantech venture capital investment exploded in 2006

- 70 % relates to energy
- air, water and waste still to come

- Swedish Energy and environmental investments has increased 300 % last from Q4 2006 to Q1 2007.

- but counts for only 4 % of total investment

- 74 % of the venture capital companies see "Cleantech" as the most interesting sector for future investments.

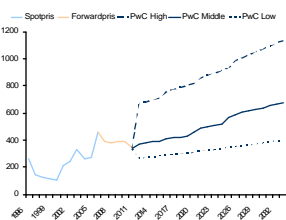


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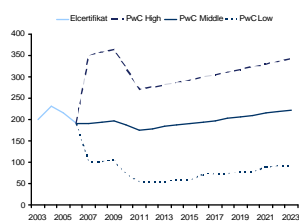
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## Investment considerations

# Renewable Energy Investment value drivers



- Cost of capital (WACC)
  - Market risk premium 4,5 % according to PwC poll March 2007
  - Systematic risk, Beta 0,8 – 1,1
  - Possible size premium



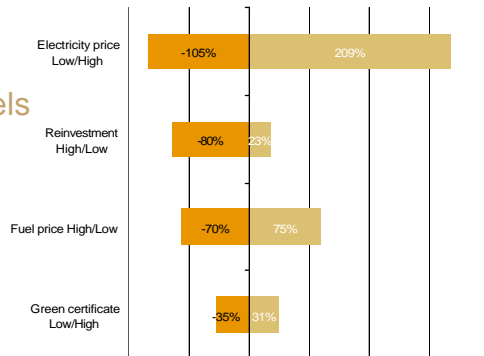
- Electricity future spot price
- Green certificate future price
- Carbon future price
- Bioenergy fuel market development
- Governmental regulations

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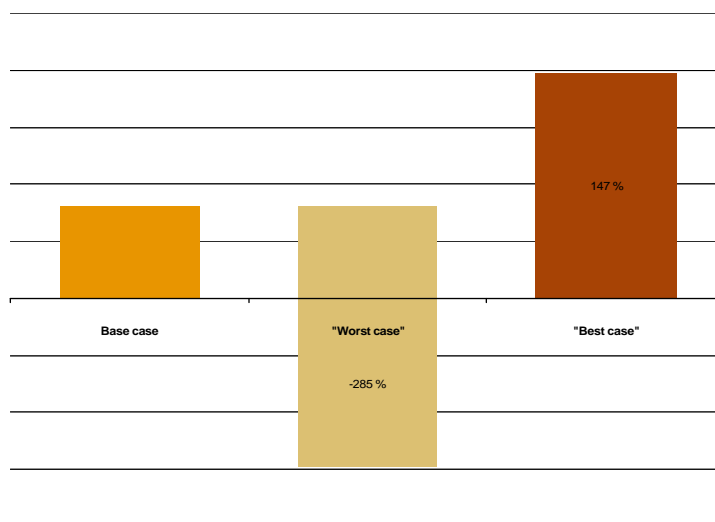
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## Future electricity price dominant value driver

- Case study:
  - Investment in power production based on biofuels
  - Cost of equity 8 %
  - WACC 6,9 %
- Electricity price dominant value driver
- Fuel price also significant impact on value



## Investing in power production can be a risky business



## Conclusion

### Future investments are on the way but be aware of price risks

- EU sets ambitious targets on Renewable Energy
- Major increase in biomass and wind are projected
- US leads the in venture capital – EU a slow-starter
- Dramatic increase in world Clean-Tech investments in 2006
- Power productions investment value based on Bioenergy is heavily dependent on future electricity price
- Bio based energy investments are here to stay



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## Thank you for your attention

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